

***THREE-DIMENSIONAL CLOUD RETRIEVALS FROM THE 2009 DOE ARM
CLOUD TOMOGRAPHY FIELD EXPERIMENT***

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ABSTRACT

A field campaign was conducted by the DOE Atmospheric Radiation Measurement program in the Summer of 2009 to examine the feasibility of the cloud tomography method for long-term 3D observation of cloud and water vapor. Five scanning microwave radiometers were arranged linearly to continuously scan the upper hemisphere. Radiation closure studies show that the calculated brightness temperatures during clear sky conditions agree with the observed ones within 1.0 K. A 2D slice of both the cloud liquid and the water vapor fields is obtained every two minutes. We then construct 3D images of cloud and water vapor by combining sequential 2D slices in the same way as a spiral CT scanner reconstructs a 3D human image from multiple 2D slices. Cloud and water vapor retrieval results for a variety of sky cover conditions will be presented.